

CLAIMS

1. Block copolymer corresponding to the following formula:

5 $I-(B)_n-(A)_m$, in which n is an integer greater than or equal to 1, m an integer less than or equal to n , B a polymer block directly bonded to the core I via a covalent bond, obtained by the polymerization of a mixture of monomers (B_0) comprising:

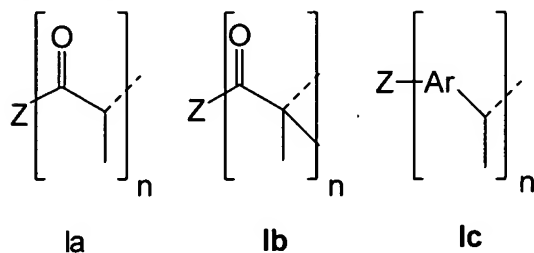
- from 90 to 100% by weight of at least one monomer (B_1) chosen from
10 the group consisting of linear or branched C_1 - C_{12} alkyl acrylates,

- from 0 to 10% by weight of at least one monomer (B_2) chosen from acids and their derivatives, such as acrylic acid, methacrylic acid and their salts, A a polymer block directly bonded to the B block via a covalent bond, obtained by the polymerization of a mixture of monomers (A_0) comprising:

15 - from 95 to 100% by weight of at least one monomer (A_1) chosen from the group consisting of methacrylic monomers, styrene monomers and their derivatives,

- from 0 to 5% by weight of at least one monomer (A_2) chosen from acids and their derivatives, such as acrylic acid, methacrylic acid and their
20 sodium or potassium salts,

the core I being an organic group corresponding to one of the following formulae:



25 in which Ar denotes a substituted aromatic group and Z is a polyfunctional organic or inorganic radical with a molar mass of greater than or equal to 14.

2. Copolymer according to Claim 1, characterized in that the said polyfunctional organic radical is chosen from the following radicals: 1,2-ethanedioxy, 1,3-propanedioxy, 1,4-butanedioxy, 1,6-hexanedioxy, 1,3,5-tris(2-

ethoxy)cyanuric acid, polyaminoamines, such as polyethyleneamines, 1,3,5-tris(2-ethylamino)cyanuric acid, polythioxy, phosphonate or polyphosphonate.

3. Copolymer according to Claim 1, characterized in that the said polyfunctional inorganic radical is chosen from the complexes of formula $M^{n+}O_n^-$, in which M is a magnesium, calcium, aluminium, titanium, zirconium, chromium, molybdenum, tungsten, manganese, iron, cobalt, nickel, palladium, platinum, copper, silver, gold, zinc or tin atom.
4. Copolymer according to Claim 1, characterized in that B_0 comprises:

 - from 92 to 98% by weight of monomers B_1 and
 - from 2 to 8% by weight of monomers B_2 .
5. Copolymer according to one of the preceding claims, characterized in that B_2 is preferably acrylic acid.
6. Copolymer according to one of the preceding claims, characterized in that A_0 comprises:

 - from 95 to 98% by weight of monomers A_1 and
 - from 2 to 5% by weight of monomers A_2 .
7. Copolymer according to one of the preceding claims, characterized in that A_2 is preferably methacrylic acid.
8. Copolymer according to one of the preceding claims, characterized in that the B block represents from 50 to 95% by weight of the total weight of the said copolymer.
9. Copolymer according to one of the preceding claims, characterized in that the B block has a T_g of less than 0°C and preferably of less than -30°C .
10. Copolymer according to one of the preceding claims, characterized in that

the B block has a weight-average mass of between 2000 and 300 000 g/mol, preferably of between 10 000 and 200 000, and a polydispersity index of between 1 and 3.

5 11. Copolymer according to Claim 1, characterized in that the A block has a Tg of greater than ambient temperature and preferably of greater than 90°C

10 12. Process for the preparation of the copolymer of any one of the preceding claims by controlled radical polymerization according to the following scheme:

the polymerization at a temperature of between 60 and 150°C of the mixture B₀, in the presence of an alkoxyamine and of an agent for controlling the polymerization, up to a degree of conversion of 90%,

the removal of a portion or of all of the unreacted monomers B₀,

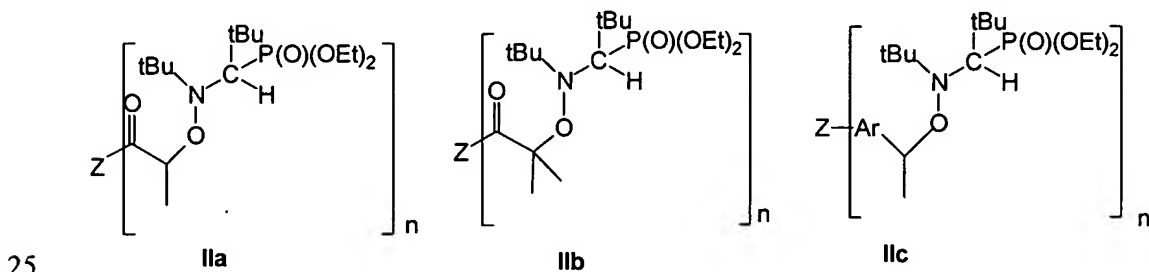
15 the addition and the polymerization of the mixture A₀,

the removal of all of the unreacted monomers and recovery of the copolymer formed,

characterized in that the recovery is carried out via a mixer-dryer at a pressure of less than 60 mbar, at a product temperature of greater than 150°C and at a

20 mixer outlet flow rate ranging from 1 to 15 kg/h.

13. Process according to Claim 12, characterized in that the alkoxyamine is chosen from the compounds corresponding to one of the following formulae:

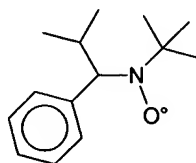
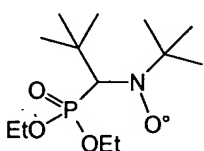


in which Z is a polyfunctional organic or inorganic radical with a molar mass of greater than or equal to 14.

14. Process according to Claim 13, characterized in that the said polyfunctional organic radical is chosen from the following radicals: 1,2-ethanedioxy, 1,3-propanedioxy, 1,4-butanedioxy, 1,6-hexanedioxy, 1,3,5-tris(2-ethoxy)cyanuric acid, polyaminoamines, such as polyethyleneamines, 1,3,5-tris(2-ethylamino)cyanuric acid, polythioxy, phosphonate or polyphosphonate.

15. Process according to Claim 13, characterized in that the said polyfunctional inorganic radical is chosen from the complexes of formula $M^{n+}O_n^-$, in which M is a magnesium, calcium, aluminium, titanium, zirconium, chromium, molybdenum, tungsten, manganese, iron, cobalt, nickel, palladium, platinum, copper, silver, gold, zinc or tin atom.

16. Process according to one of Claims 12 to 15, characterized in that the control agent is chosen from the compounds corresponding to one of the following formulae:



17. Adhesive composition comprising:

- from 15 to 50% by weight of the total weight of the composition of at least one block copolymer according to one of Claims 1 to 11,
- from 35 to 50% by weight of the total weight of the composition of at least one tackifying resin,
- from 10 to 30% by weight of the total weight of the composition of at least one plasticizer.

18. Composition according to Claim 17, characterized in that the plasticizer is chosen from oils of trimellitate type, such as trioctyl trimellitate, or predominantly naphthenic oils, such as Catenex N956 from Shell.

19. Composition according to Claim 17, characterized in that the tackifying resin is chosen from the group consisting of resins based on rosins, on rosin ester, on polyterpene, on hydroxylated polyester, on terpene styrene, on pentaerythritol
5 terpene or on terpene phenol (typically).

20. Use of the composition according to one of Claims 17 to 19 in the manufacture of adhesive tapes or labels.

10 21. Adhesive tapes and labels comprising an adhesive composition according to one of Claims 17 to 19.